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Some of the early volumes of the Society's Transactions are out of print. Any single volume of the years 1868-1887, is sold at 10s. to Fellows. The volumes for 1868-1890, in sets of not less than five, as well as the five of the Third Series (1862-1867), can be obtained by Fellows at greatly reduced prices on application to the Secretary. The following is a price list of recently published parts of the TRANSACTIONS—

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Proceedings, Vol. V: Part I, 4s. 0d., to Fellows, 3s. 0d.

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VOL. V.

1930.

Wednesday, February 5th, 1930.

Dr. K. JORDAN, President, in the Chair.

Obituary.

The PRESIDENT announced the death of Mr. EUSTACE R. BANKES, a Fellow of the Society.

Election of Fellow.

The following was elected a Fellow of the Society :—W. MALDWYN DAVIES, B.Sc., Ph.D., University College of North Wales, Bangor.

Mr. E. A. ATMORE was elected a Special Life Fellow.

Exhibits.

A BRED SERIES OF *NONAGRIA SPARGANII*.—Mr. H. J. TURNER, on behalf of Mr. A. G. WIGHTMAN of Pulborough, exhibited a long bred series of *Nonagria sparganii*, a very local species of Noctuid, from the marshes of N.E. Kent and East Sussex. Of the variation Barrett says: "Variation in this species seems to be confined to greater or lesser intensity of the red or orange clouding and of the black along the nervure." It was seen from the series exhibited that the variation went much beyond this. In some specimens there was no trace of red. In others the fringes were beautifully pink. The hind-wings varied much, in some cases approaching the depth of colour of the fore-wings. In others the nervures were more or less heavily marked by black scaling on the basal two-thirds. In others they were pale in colour. Typical males and females were indicated and also the three forms named by Tutt were marked *obsoleta*, *rufescens*, and *bipunctata*, together with five other unnamed forms. In a second box were six further specimens all remarkable, either in colour or in marking or in both, for their extreme development.

POMPIDIDS AND SPHEGIDS: DIFFERENT METHODS ADOPTED WHEN FILLING UP BURROWS.—Dr. G. D. HALE CARPENTER said :—

"This note is communicated in the hope of eliciting observations to support or overthrow a conclusion I have formed from my own observations in tropical East Africa. It appears that there is a radical difference between these two groups of Fossors in the manner in which the burrow is filled up after the prey has been

dragged in. I contributed a note to *Proc. Ent. Soc. Lond.* 1917: lix, which gives a description of what seems to be a typical manoeuvre of the POMPILIDAE, in this case *Batozonus fuliginosus*, Klug, var. *sepulchralis*, Sm. The difference between Pompilids and Sphegids to which I then drew attention has been confirmed by all my subsequent observations, and it seems to imply a deeply seated difference in instinct and neuro-muscular functions. Pompilids seem to use the end of the abdomen, Sphegids the front of the head, to ram down the earth over the prey. Can this be confirmed by entomologists in other parts of the world?"

THE GENERIC POSITION AND IDENTITY OF THE NYMPHALINE BUTTERFLY KNOWN AS *NEPTIS IMITANS*, OBERTHÜR, AND AS *HESTINA NAMOIDES*, DE NICÉV.—MR. G. TALBOT said:—

This remarkable species with a pattern suggestive of the Danaine *Caduga sita*, Koll., was described by Oberthür (1897, *Bull. Soc. ent. Fr.*, 1897: 192, fig. 11), and again figured by him in *Études Lep. Comp.*, 12 (2): 42, pl. CDIX, fig. 3507. Oberthür gives an excellent figure but no description, and during 30 years he received less than 20 specimens from Tsekou and Siao-Ouisi (or Wei-Si), N.W. Yunnan. The Oberthür series of 15 ♂♂ and 7 ♀♀ is in the British Museum.

The species was also named in 1900 by de Nicéville (*J. Bombay Nat. Hist. Soc.*, 13: 166, pl. DD, fig. 10) from a specimen taken at Tsekou. Misled by its resemblance, he treated it as a *Hestina* and called it *Hestina namoides*. This was copied by Röber in Seitz, *Macrolepidopt. World*, 1: 193, and later was quoted by Frühstorfer in Vol. 9: 704.

The excellent figure given by de Nicéville leaves no doubt as to the identity of this insect with the *imitans* of Oberthür.

A further note on this species is given by Mr. H. T. G. Watkins (1927, *Ann. Mag. Nat. Hist.*, (9) 19: 319, who records 2 ♀♀ taken in N.W. Yunnan by Prof. Gregory.

At a meeting of this Society on Oct. 18th, 1916, Mr. Talbot exhibited a specimen of this insect and pointed out that it resembled more closely the genus *Rahinda*, although departing widely from known species in size and pattern (1916, *Proc. Ent. Soc. Lond.*, 1916: lxxiii).

This insect was again brought before the Society as the result of a request from his friend Prof. Poulton to confirm his idea that *imitans* was a *Rahinda*. Upon receiving this communication the author at once scented danger, because it invariably happens that the Professor's questions lead to something important. In this case it led to a re-examination of *imitans*, which was found to be not a true *Rahinda*, but was identical in neurination and palpi with the species known as *Neptis raddei*, Brem. (1864, *Lep. Ost. Sibir.*: 18, pl. 1, fig. 9), a native of Amurland and the Ussuri.

The species *raddei* possesses a striped Danaine pattern, perhaps more reminiscent of a *Hestina*. For this insect Moore erected the genus *Aldania* (1895, *Lep. Indica*, 3: 46). To this genus therefore must be assigned the species called *imitans*, Ob.

The chief points by which *Aldania* is distinguished from *Neptis* and *Rahinda* are:—Fore-wing with the first subcostal arising at a greater distance from the end of the cell, and the stalk of the second subcostal shorter than in *Rahinda*.

Hind-wing with the praecostal spur arising a little distad of the base of vein 7, so that the angle at the base of 7 and 8 is more acute. Palpi with the third segment hairy as in *Neptis*.

An interesting problem is presented when considering the existence of these *Aldania* in areas where the models are very rare or are absent. *A. imitans* occurs with its commoner co-mimics *Papilio agestor*, Gray, and *Hestina nama*, Dbl., but it appears that these latter are by no means as common in Yunnan as in India. As regards the Danaine model *D. tytia*, Gray, we find that in N.W. Yunnan where *imitans* occurs, the Danaine has been rarely recorded. The Oberthür collection in the B.M. does not contain any specimens from this area whence Oberthür received large collections. From Szechuen, north of the Yangtze, he received a good many. One would therefore expect to find *imitans* occurring in this area too. Mr. H. T. G. Watkins has recorded (1927, *Ann. Mag. Nat. Hist.*, (9) 19: 314, 1927) a single pair of *tytia* from N.W. Yunnan, whilst in the Hill Museum are two specimens from Teng-Yueh in S.W. Yunnan; this is all the evidence we have at present of its existence in the area of the mimic.

It may be worth noting that Mr. Watkins does not record any specimens either of the *Papilio* or of *Hestina* in his report on the Gregory collection from N.W. Yunnan.

Proceeding north, *D. tytia* appears to become rarer, for there is no record of this nor of any other Danaine from the Ussuri and Amur, only a record by Oberthür in 1880 of its occurrence on the island of Askold. In this area and nowhere else is found *raddei*, the other species of *Aldania*, which has become very different from *imitans*, and does not appear to have any similarly patterned species living with it. It is possible, however, that the common Pierine, *Aporia hippia*, Brem., has served as the model.

Does *raddei* represent the original *Aldania* evolved from some unicolorous ancestor of the *Neptis* group, which afterwards became modified as its range extended to the area occupied by *D. tytia*, or on the other hand does *imitans* represent the original type evolved in an area of abundant *tytia*, which afterwards became modified in reverting to some *Neptis*-like ancestor, as it spread northwards out of the range of the Danaine?

If it be conceded that birds are a factor in the evolution of mimetic patterns in butterflies, the possible result of bird migration should be taken in consideration. Experience of certain patterns in India would be utilised after migrating to China and Siberia, where similar patterns would be seen and avoided.

MIMETIC RESEMBLANCE OF AN AEGERIID MOTH TO AN ABUNDANT TYPE OF BRACONID MODEL; AND THE FLIGHT OF THE LYCAENID *MIMACRAEA POULTONI*, NEAVE, TO THAT OF AN *ACRAEA*, OBSERVED IN UGANDA BY G. H. E. HOPKINS.—Prof. POULTON said that he had just received the following note, written 3 January, 1930, from his friend Mr. Hopkins, at Kampala.

"By this mail I am sending you a small box containing a Sesiid and a couple of Braconids. Braconids of the type sent are common in Kampala, and one evening (1 August, 1929) I noticed what I thought was one of them sitting on a leaf. I boxed it without examination and took it to Hancock, to find when we had killed it that it was the enclosed moth! The mimics here are really very convincing

sometimes. I was delighted the other day to come across *Mimacraea poultoni*, Neave. I was collecting in the forest and brushed against a creeper, when three butterflies flew off; I thought they were *Acraeas* and paid no more attention to them, but noticed on the creeper some specimens of a Coccid which I made up my mind to collect on the way back. When I returned, however, the butterflies were sitting close together on the stem among the Coccids, and I decided they were of more interest than had appeared. Looking closer there was something in their appearance (I think a slight lack of transparency) which did not seem quite *Acraeine* and when I captured and pinched them the ease with which they died gave them away at once. But even their flight did not strike me as at all un-*Acraeine* and I was completely deceived at first. It was only their association with the Coccid which made me suspect them."

The beautiful little *Aegeriid* moth had been kindly determined as a new species and described below * by Mr. Edward Meyrick, F.R.S. It was a most interesting addition to the association described and figured by Dr. G. A. K. Marshall, F.R.S., in *Trans. Ent. Soc. Lond.*, 1902: 533, pl. xviii, figs. 53-58. Dr. Marshall concluded that "the pattern is certainly set by the *BRACONIDAE*, which are common, conspicuous, slow-flying insects, protected by their strong smell." Three species of the models were figured together with a *Reduviid* and a *Longicorn* mimic, all from the neighbourhood of Salisbury, Mashonaland. Prof. Poulton had been informed by Mr. D. S. Wilkinson that an immense number of African species in the genera *Iphiaulax* and *Ipobracon*, to which the models belong, was already known and was being continually increased. There were exhibited with the mimic two of its *Braconid* models kindly included by Mr. G. L. R. Hancock. They were taken at Kampala, 15 March and 20 July, 1929, respectively.

The *Acraea*-like flight of the *Liptenine* *Lycaenid* *Mimacraea poultoni* recalled the note by Dr. W. A. Lamborn and Mr. Rodney Wood at a recent meeting (1929, *Proc. Ent. Soc. Lond.*, 4: 107), in which it was recorded that *Mimacraea marshalli*, Trim., had at first completely deceived them by its resemblance on the wing to *Acraea encedon*, L.

Dr. G. D. Hale Carpenter said that he thought the wonderful little moth discovered by Mr. Hopkins at Kampala, Uganda, would be found to occur elsewhere, and it was much to be hoped that other specimens would soon be obtained. During the end of September 1929 he was on tour in the West Nile district of Uganda, the N.W. corner of the Protectorate. He saw one day on a leaf of an orange-tree an insect which he felt certain was a moth similar to Mr. Hopkins' specimen which

*

***Trichocerota phoenosoma*, n. sp.**

♀. 18 mm. Head metallic-blue, postorbital scales yellowish. Palpi orange tinged crimson towards apex. Antennae dark purple-grey, apex whitish. Thorax crimson. Abdomen crimson with purple reflections. Legs yellowish suffused violet-crimson, posterior pair violet-crimson with three apical joints of tarsi dark grey. Fore-wings deep purple becoming bronzy posteriorly, costal area suffused dark indigo-fuscous except towards apex: cilia purplish-bronzy. Hind-wings dark purple-grey, becoming subhyaline in disc, dorsum narrowly crimson-red towards base; cilia dark grey, suffused red at base on red dorsal area, at base of wing wholly crimson.

UGANDA, Kampala, August; 1 ex. (*G. H. E. Hopkins*).

TYPE in Hope Dept., Oxford Univ. Museum.

EDWARD MEYRICK.

he had seen at Kampala a few weeks before. The one he observed was extremely Braconoid in general appearance and moved about among the foliage in a manner generally similar to that of its models. He attempted to box it as it sat on a leaf, but it eluded him, and flew off slowly and with a straight flight, its brilliant red body shining strongly in the bright sun.

THE ATTACKS OF BIRDS, A PENTATOMID BUG AND MANTIDAE UPON BUTTERFLIES, OBSERVED IN KENYA COLONY BY MAJ. K. A. C. DOIG.—Prof. POULTON communicated the following interesting record of observations by Major Doig, and exhibited the specimens of butterflies which had been seized by the Pentatomid and the Mantids; also the captors themselves. The Pierine butterflies had been kindly determined by Dr. F. A. Dixey, F.R.S., the Pentatomid by Mr. W. E. China and the MANTIDAE by Dr. R. Hanitsch and Mr. B. P. Uvarov.

“12 Nov. 1929: *Karundas Estate, P.O. Nyeri, Kenya Colony.*

“I have kept a sharp look-out for birds preying on butterflies, but have only come across two instances of this since last I wrote. I enclose the notes taken at the time. A large species of Fly-catcher breeds regularly in the garden here, and as soon as the young are fledged they take up position in a row on a fence at the end of the garden. I had hoped to see them taking butterflies, but have been disappointed. They seem to feed entirely on small Diptera and flying Termites.

“I also enclose a further note on a Mantis that was under observation for five days and fed exclusively on butterflies. I am sending you this Mantis and the wings of the butterflies that it devoured, also a carnivorous tree-bug that I found feeding on a Pierid.

“I frequently see lizards snapping at the hind-wings of a *Papilio*,* which is very abundant here, but the butterfly has always escaped with badly damaged wings and apparently otherwise none the worse from the encounter. I am keeping a sharp look-out and will report any more cases of birds preying on butterflies that I may come across; also anything interesting that may be noted *re* the scent of butterflies.

“The following observations were made at Karundas Estate (6000 ft.), P.O. Nyeri, Kenya Colony :—

“21 May, 1929.—Whilst fishing in the Thego River this morning I saw the common Bee-eater capture a small white butterfly on the wing, fly to the bank a few yards away and devour the insect.

“16 July, 1929.—There was a considerable migration of *Belenois mesentina*, Cram., across the garden to-day. From the southern slopes of Mt. Kenya towards the Aberdare range the butterflies were flying against the wind in a north-westerly direction. Two of the Lesser Pied Hornbills flew with their slow undulating flight across the stream of butterfly migration, and I distinctly saw one Hornbill capture three butterflies and the other one butterfly in a distance of about fifty yards. Apparently the whole insect was swallowed, as no wings fluttered to the ground.

* Two males of *Papilio demodocus*, Esp., labelled, “damaged by lizards,” were exhibited to the meeting. Nearly the whole of the R.H.W. of one specimen and the L.H.W. of the other had been torn away, together with the anal area of the R.H.W. of the latter.—E.B.P.

"30 May, 1929.—Found a carnivorous tree-bug devouring a Pierid butterfly this morning. It was cold and misty and I expect the butterfly was in a torpid condition when captured. [The bug is *Macrorhaphis*, sp. n., ♀, near *spureata*, Walk. (PENTATOMIDÆ); the Pierine—*Teracolus hetaera*, Gerst., ♂.]

"11 Aug., 1929.—I noticed a black Mantis devouring a Pierid butterfly to-day in the forest. The Mantis was resting on the stem of a flowering shrub, and would have been quite invisible if it had not been for the fluttering of the butterfly which attracted my attention. [The Mantis is *Phyllocrania paradoxa*, Burm., sex uncertain as part of the body is missing; the Pierine—*Teracolus chrysonome*, Klug, ♂.]

"1 July, 1929.—For the past five days I have had a large Mantis under observation. It has taken up its position on a small bushy plant with purple flowers.* I have seen it capture numerous butterflies, which it rapidly devours, letting the wings fall to the ground."

[The Mantis is *Hemiempusa capensis*, Burm., ♀; the nineteen butterflies (determined by the wings, of which all four of every specimen except the two *Acraeas* were received) are in the following list:—

<i>Danaïda chrysippus</i> , f. <i>dorippus</i> , Kl., ♀.	2 <i>Teracolus chrysonome</i> , Klug, ♂.
„ (<i>Melinda</i>) <i>formosa</i> , Godm., ♂.	2 <i>Eronia cleodora</i> , Hübn., ♂.
<i>Gnophodes parmeno</i> , Dbl. & Hew., ♀.	<i>Pinacopteryx pigea</i> , Boisd., ♂.
<i>Eurytela hiarbas</i> , Drury, ♂.	<i>Belenois zochalia</i> , Boisd., ♂.
<i>Acraea uvui</i> , Gr.-Sm., ♂.	„ <i>severina</i> , Cram., ♂.
„ <i>johnstoni</i> , Godm., ♂.	<i>Papilio dardanus</i> , ♀ f. <i>planemoides</i> , Trim.
<i>Colias electo</i> , L., ♂.	<i>Papilio dardanus</i> , ♀ f. <i>cenea</i> , Stoll (white markings in F.W.).
<i>Terias brigitta</i> , Cram., ♂.	
<i>Terias regularis</i> , Butl., ♀.	
<i>Teracolus achine</i> , Cram., ♂.	

The small proportion of females—five out of nineteen—was probably to be explained by the fact that male butterflies are more often upon the wing in the open and visiting flowers. The *Danaines*, *Acraeas* and the large proportion of *Pierines* support the opinion that predacious insects are important enemies of distasteful butterflies. The *planemoides* female of *P. dardanus* was a fine typically marked example, and it was something of a surprise to find that one out of two females from this locality should be a mimic of *Planema macarista*, E.M.Sh., and *poggei nelsoni*, Gr.-Sm. It was interesting to note that there is a distinct beak-mark crossing the right H.W. of the male *D. formosa*.—E.B.P.]

BUTTERFLIES CAPTURED BY A PARADISE FLYCATCHER, *TCHITREA VIRIDIS SUAEHELICA* (REICHW.), AT NAIROBI.—Prof. POULTON exhibited wings of the following butterflies collected by his friend Dr. V. G. L. van Someren in June 1926. They had been rejected by a Flycatcher which, with its young, had been seen devouring the insects.

Hypolimnastis misippus, L., ♀ f. *misippus*—(left F.W.); ♀ f. *inaria*, Cram. (R.

* Prof. A. G. Tansley, F.R.S., has kindly informed me that the plant has been identified at Kew as *Gutenbergia petersii*, Steetz, and that it belongs to the *Vernoniaeae* (Compositae), and is apparently restricted to Kenya Colony and Tanganyika Territory.—E.B.P.

and L.F.W. of two examples). Also portions of R. and L.H.W. evidently belonging to one or more of the above three specimens.

Papilio dardanus, Brown, ♂—the greater part of R. and L.H.W. with the black markings rather strongly developed and suggestive of the race *d. tibullus*, Kirb., or of a form transitional between this and *d. dardanus*.

SYMMETRICAL INJURIES AT THE ANAL ANGLE OF THE HIND-WINGS OF *THECLA W-ALBUM*, L.—Prof. POULTON exhibited six specimens of *w-album*, kindly given to him by his friend Dr. R. C. L. Perkins, F.R.S. They had been taken about 1918 or 1919 by his father, the Rev. C. M. Perkins, in the Rectory garden or in the neighbouring woods, at Alderley, near Wotton-under-Edge, Gloucestershire. They were doubtless captured towards the end of his life and when he was nearly blind, for his other specimens, taken not many years earlier, were in comparatively good condition. Had his father not been almost blind at the time Dr. Perkins believes that these specimens would not have been boxed. The specimens were therefore almost certainly examples of indiscriminate collection, and it was most interesting to find that three out of the six exhibited the symmetrical injuries at the anal angles of both hind-wings that are characteristic of bird attack. The injuries inflicted by lizards were of a different form and were in any case most unlikely to be found in British examples of this species. The exhibit brought home to us the conclusion that the indirect evidence of bird attack—generally obscured by the neglect of imperfect specimens—was far more prevalent than many naturalists have supposed.

THE ATTACKS OF BIRDS UPON BUTTERFLIES AS OBSERVED IN AFRICA.—Prof. POULTON said that he had received the following contribution to the discussion on this subject in a letter written at Pretoria, 10 December, 1929, by Mr. H. C. Kenway. The confirmation of Prof. Bainbrigge Fletcher's conclusions based on his experience in India (1929, *Proc. Ent. Soc. Lond.*, 4: 104) was very striking.

"I have read the two letters on the subject of birds eating butterflies,* and I must confess that after perusing some hundreds of similar arguments I am a little tired of the attitude of men like Professor MacBride.

"Having been resident in S. and E. Africa for a third of a century, having been a keen nature student all my life and having, by the nature of my occupations (Surveying and Civil Engineering), had rather better opportunities for observation than the average amateur I am sufficiently arrogant to believe that I am at least as well qualified to give an opinion on this particular point as most professional entomologists.

"Before doing so I would, however, like to emphasize certain factors which appear to me to be somewhat lightly regarded by the people who desire, for some obscure reason, to belittle the serious nature of bird attack on butterflies.

"*First.*—Probably the greatest difficulty is that owing to the clumsiness of the observer the birds are perfectly aware that they are under observation and therefore frequently refrain from attack as laying them open to great danger. It must be understood that all natives continually trap, birdlime and in various ways seek to capture the small birds for food. When, therefore, a bird sees that

* *Nature*, vol. cxxiii, 8 June, 1929, p. 874; vol. cxxiv, 12 Oct., 1929, p. 577.

it is being watched it becomes nervous and the observations made upon its behaviour are valueless.

"*Secondly.*—The fact that forest and bush are the best localities for both birds and butterflies enormously increases the difficulty (great anywhere owing to the small size and rapid movement of the objects) of accurate observation.

"*Thirdly.*—I regret to say that many people appear to approach the subject with minds already biassed and unconsciously hope not to be convinced.

"Long before I took any serious interest in the matter I was struck by the number of butterflies taken by birds, monkeys, chameleons, MANTIDAE and other enemies. I have often lain under cover for hours watching, with 8-power Zeiss field-glasses, patches of flowers, and seen small insect-eating birds sit, sometimes a dozen together, watching butterflies. When an insect settled on a flower there was a dash, the snap of a bill and in about three cases in ten a dead butterfly. The birds used to get rid of the wings by wiping their beaks across a branch. Drongos and other larger birds do the same. The very small birds have a weakness for LYCAENIDAE, *Terias* and similar-sized insects; the larger take NYMPHALIDAE. I have seldom seen *Papilio*, *Teracolus*, or ACRAEINAE taken, and *Mylothris* or DANAINAE, never, and consider them all distasteful in varying degrees. *Charaxes* are frequently taken when absorbed in sucking sap from trees.

"As to the seriousness of the attack, I have seen over thirty butterflies taken in an hour. Now if you consider that it is impossible properly to watch an area of more than about 16 square yards, and allow that one per cent. of the African continent is suitable for bird attack on butterflies for eight hours a day, 120 days a year, you will see that the attack certainly is serious, especially when considered as part of a general attack by Asilid and other flies, MANTIDAE, REPTILIA, hail-storms and a dozen other destructive agencies. From personal experience I say emphatically that bird attack is a serious factor, although but one of many.

"The examination of birds' stomachs for the remains of such frail and easily digestible things as butterflies appears to me to indicate a defective appreciation of the relation between cause and effect. Furthermore, what I have seen is evidence, what Prof. MacBride has not seen is not evidence."

NOTES ON THE CATERPILLARS EATEN BY THE NATIVES AT BONGANDANGA, BASANKUSU, BELGIAN CONGO, BY MISS GERTRUDE VINALL.—[Prof. POULTON in communicating these interesting notes exhibited the specimens received from Miss Vinall. The earlier notes refer to the larvae of the Notodont genus *Anaphe*, known to be eaten by natives in both E. and W. Africa. Later notes refer to a variety of larvae.]

Notes on "Beluku" (Anaphe).

12 Jan., 1929.—Some of the edible caterpillars which the natives eat are in a communal nest as chrysalides. I have been saving two of these nests since last September (1928), but they have not hatched out yet. Perhaps they are dead. The natives assure me they are *Papilio dardanus*,* but I think they are moths. The natives eat these caterpillars in the early stages of the chrysalis as well as in the larval state.

* Miss Vinall wrote on 18 Apr., 1918, concerning this curious belief—"I have been told that the larva of *Papilio dardanus* spins a cocoon from which the natives wind off the silk."

2 March, 1929.—I have been keeping three of those communal nests made by the caterpillars which the natives eat. I have had them since last September, but no moths have emerged. . . . They are found usually in September and October. Two of those I have are egg-shaped and would just fit into a tall breakfast cup. The others are elongated in shape, three on one twig, and each one would just fit into a tall half-pint tumbler.

3 June, 1929.—Herewith the communal nests from which some of the moths in package No. 17 emerged. I send them in case they may be interesting. The native name of these caterpillars is "Beluku."

The moths—there appear to be two different kinds—have hatched out from three nests of the edible caterpillars, and I am enclosing them in the box of moths with this letter. They are dated the days they emerged from the nests. If possible, I will send the nests in a separate tin. When I received them, the three were hanging on to one twig. They were given me last September. The natives not only eat the caterpillars but the chrysalis as well. They take them from the nest and run a fine piece of cane through them and roast them over the fire. In most cases natives are sick when first eating caterpillars, and many are never able to eat them without severe pain and vomiting. The bodies of the natives emit a very unpleasant odour when feeding largely on caterpillars (a nutty, sickly smell). All through this part of the country the natives believe a certain bird lays the eggs which produce these caterpillars, because this bird is only heard to sing at this time of the year when the edible caterpillars are just beginning to appear. In spite of all we have told them and in spite of seeing the moths emerge from the nests, they still, many of them, adhere to their own theory. My boys called out to me on Saturday.—"Mama, did you hear that bird call? That is the bird that lays the caterpillars; they will soon be here, the dry season has commenced." I still have two more nests of a different species from those enclosed in this consignment.

[The moths which emerged from the three communal cocoons attached to one twig were determined with the kind help of Mr. W. H. T. Tams as *Anaphe venata*, Butl., and *A. panda*, Boisd. The occurrence of this latter form far to the west in the Belgian Congo was interesting; as all the specimens in the British Museum were from E. and S. Africa. Of much greater interest was the fact that both forms emerged from similar cocoons hanging together, suggesting the possibility that they were conspecific.]

Notes on various edible caterpillars.

3 June, 1929.—To our knowledge the natives around here eat thirty-three different kinds of caterpillars.

20 July, 1929.—This is well into the edible caterpillar season now. I have eight different kinds that I have been feeding in the larval stage; seven of them have started pupating in earth yesterday and to-day. I am keeping them in earth in tins with paper covers over the top and inside a wire cupboard. Is that the correct way to treat them? I mean those which pupate in earth; others have communal nests attached to twigs. I hope I shall be successful in breeding them out. Quite a number of the edible caterpillars seem to have two varieties of the same

species; for instance, I have one kind (native name Bét'été) one variety of which is creamy fawn and its fellow almost black. Then another species (native name Balanga) has one form light ginger-brown with *yellow* spines and black spines on the head, and the other light ginger-brown with *white* spines and black spines on the head. These are almost as thick as one's thumb and quite 4 inches long. I wonder if they are male and female!

We shall be glad when the caterpillar season is over, for the odour which is emitted from the bodies of the natives through the sweat-glands is unbearable, especially when they get hot at work. Of course they simply gorge themselves as they do with any food they like. Their mentality and intelligence are seriously affected while feeding largely on caterpillars. Boys normally fairly quick and intelligent in school, become dulled and with no mind at all to grasp any form of teaching. Another effect seems to be to excite sexual appetite; they become "animalish," and there are generally more palavers about at such seasons.

13 Aug., 1929.—I have a number of different edible caterpillars pupating in a wire cupboard and do hope I shall be successful in breeding the moths from them. Each is labelled with its native name, so I hope I shall be able to recognise them when you receive the moths and tell me the scientific names.

29 Aug., 1929.—The edible caterpillar season practically finished about August 20th. I have over fifty of different kinds pupating in a wire cupboard, and hope later on the moths will emerge so that I can send them to you. The natives have been quite keen in bringing me varieties, in some cases only one or two of a sort, as they said they were difficult to find.

31 Aug., 1929.—With reference to the "Beluku" [*Anaphe*; see pp. 8, 9] cocoons (3) sent to you, I did not find them myself in the forest. A native brought them to me, *all three hanging from one small twig*, and, thinking them all alike, I put them just as they were into a box covered with wire gauze. To the native mind they were all "Beluku."

I do not think the unpleasant smell from the bodies of the natives during the caterpillar season comes from "Beluku" only, for they eat all kinds indiscriminately, whatever they can find. If one kind more than another produces a bad odour I should say it is a caterpillar called Bét'été, of which I have some pupating in earth in tins in a gauze cupboard and I hope to send you the moths later. [These moths have not as yet been received.] They made my small ante-room quite smell when they were feeding. These are in pairs (one black and one a deep flesh colour, no hairs or spines on them apparently). These with one or two other kinds all feed on a tree called "Bompose," which also has a bad smell, and if poles from this tree are used in making a native house the smell inside is very unpleasant. I once slept in such a house and not knowing the cause of the bad smell sent to the station for lysol and disinfectants.

So far, I have only found two kinds of edible caterpillars (from the natives' point of view), which build a communal nest. They are "Beluku" [*Anaphe*] as sent and "Belanga." I have two "Belanga" cocoons which were given me last September (1928), from which the moths have not as yet emerged. They may be dead, as I had them in the same week as the "Beluku" sent to you. Last week one of our workmen put some "Belanga" caterpillars into a tea-tin intending

to eat them, but when they spun a cocoon he offered them to me if I would give him a piece of meat in exchange when my hunter kills a pig; so I have those of this year in the same wire cupboard as the 1928 ones. Most of the edible caterpillars the natives have brought me this season are those which pupate separately in the earth. So I have each one in a separate tin covered over with a piece of muslin and kept in my old wire food cupboard which stands on the verandah and so gets sun and light and air (I have had a new one made for food). The native names are under each tin with date of pupation, and thus I hope to identify them. I have between 50 and 60 such tins so I am looking forward to great things. I could not get the edible caterpillars myself as they are mostly found at the tops of very high trees; the lads climb up them like monkeys and get them down in large tinfuls, hundreds at a time often. When ready to pupate they drop from the tree into the road and I have then picked them up, but most of those I have in the cupboard were brought me by my boys, attached to a branch of the special tree on which they feed, and I have fed them until they were ready to pupate.

I wonder if the reason why quite a few edible caterpillars feed on the "Bompose" tree is because the bad smell from the wood of the tree acts as a protection from enemies! * In most other kinds of edible caterpillars it is one kind of caterpillar to one kind of tree and they feed on no others. These trees are known to the natives, and each one hunts for the trees on which the kind of caterpillar he considers the greatest delicacy feeds.

I have found out to-day that the Mongo natives only eat the chrysalis in its early stage. My own house-boys do not eat the pupa at all, as they say it hurts the mouth. There are different ways of cooking the different species. In some kinds of caterpillars the faeces are squeezed out before cooking; in others it is not so, but they are cooked just as they are found. Some are boiled, some roasted, some dried and pounded and then cooked.

9 Sept., 1929.—To-night two of my edible caterpillars have changed into moths: one has a tremendously large body. [Evidently *Daphnis nerii*, L., which emerged 9 Sept.] The wings are not yet dry or I would have sent it in this consignment. My house-boys are never going to eat caterpillars again, so they say.

2 Oct., 1929.—I am sending a few of the moths from the edible caterpillars with particulars under their native names. We work under difficulties here with so many pests to contend with. Although the caterpillars are kept each one in a separate tin covered with muslin in a wire cupboard the legs of which stand in tins of paraffin and are frequently painted with creosote, yet the smallest of ants, which we call "ginger ants," and cockroaches attack them. As soon as they emerge, I put them inside a wire meat-cover to allow them to climb up and dry their wings.

Moths and pupa-cases of edible larvae.

No. 1. *Lontompito*. [The larva of the Sphingid moth, *Daphnis nerii*, L.]

Started to pupate on 16/8/29, and emerged on 9/9/29. Feeds on *Elelembé* tree.

* It is very interesting to find that Miss Vinall has independently arrived at Haase's theory of the origin of the distasteful qualities of specially protected Lepidoptera. Specimens of the "Bompose" tree, if possible with flowers and fruit or seed, and of the imago which is produced by the "Beteto" larva, are eagerly awaited.—E.B.P.

A second example labelled No. 4, with the same data and bred from a larva on the same food-plant, failed to expand properly. [Both moths were males.]

No. 2. *Nkulanjembo*. [The larva of the Notodontid, *Alenophalera inconspicua*, Gaede.]

These caterpillars are red striped with black and also black striped with white. They feed on the *Liyamba* tree. The male moth sent emerged 9/9/29.

No. 3. *Ebuluku*. [The larva of the Saturniid moth, *Bunaea phaeax*, Druce.]

This large green caterpillar is 4 to 5 inches long, and as thick as a man's thumb. Its two shades of green so closely resemble in colour the top and underside of the leaves of the *Bonkuka* tree on which it feeds, that it is difficult to locate at once. It feeds also on the *Bosenge* tree. Pupation—26/7/29; emergence of female—10/9/29.

[A number of very large eggs accompanied the specimen. Miss Vinall found them under the cover where the moth was drying its wings and her native boy said that they were laid during emergence. Many were found in the earth with the pupa-case and some actually within it, but they may have become enclosed accidentally during the journey.]

No. 5. *Elima*. [The larva of the Saturniid, *Nudaurelia dione*, F.]

A black, yellow-ringed caterpillar which feeds on the *Bofeko* tree. Of two larvae one pupated 21/8/29, the other 22/8/29, two males emerging 30/9/29. The former specimen was attacked before its wings had expanded by the smallest of our ants—the “ginger-ant.” [The skins of both larvae were sent with the pupa-cases.]

[The fact that the larva of the Oleander Hawk moth should be used as a regular article of food was of great interest in view of the terror which the snake-like appearance and eye-like marks of Sphingid larvae are known to arouse in man and animals (*Trans. Ent. Soc. Lond.*, 1925 (1926), p. 580, and references). I do not know of any actual observations or experiments which prove that the larva of *D. nerii* is thus able to alarm its enemies, but I well remember being told by the late Lord Walsingham that it brightens and I think renders more prominent its blue “eyes” when disturbed. It seems probable that some enterprising native tested the power which appeared to be implied in the terrifying attitude and markings of the caterpillar, and finding it to be nothing but bluff, introduced the custom of eating the “Lontompito.” The behaviour of a lizard (*Lacerta viridis*), when offered the larva of *Choerocampa elpenor*, L., was precisely of this experimental kind and resulted in exposure of the deception and a hearty meal (Poulton, *Colours of Animals*, London, 1890, p. 261). I have asked Miss Vinall if she will kindly inquire whether the natives are ever alarmed by the “Lontompito.”

The Notodont *Alenophalera inconspicua* (“Nkulanjembo”) is apparently very rare in collections, the British Museum possessing only two examples with great individual differences.—E.B.P.]

[In a letter received to-day Miss Vinall gives the following information about

the caterpillar-eating natives :—" The Mongo people are all around us at Bongandanga, but across the river live the Ngombe folk, amongst whom we also work, and both tribes are working together in our teachers' training school at Bongandanga. Both are of the Bantu race, I believe. The Ngombe folk eat all kinds of edible caterpillars and also pupae, but there are some kinds that the Mongo folk do not eat. The native names of caterpillars I have quoted are Lomongo. I do not speak Lingombe.

" The river that passes by Bongandanga is the Lopori, which is a tributary of the Lulonga, which latter is a tributary of the Congo."

In reply to the question whether the effect upon the natives is simply that of a rich nitrogenous and fatty diet, Miss Vinall wrote :—" No, we do not notice that the same conditions obtain in the natives after eating largely of animal food as those which are evident after eating the caterpillars."—E.B.P., 15 February, 1930.]

THE CONSTRUCTION OF FALSE BRACONID COCOONS BY THE W. AFRICAN BOMBYCID LARVA *NORASUMA KOLGA*, DRUCE.—Prof. POULTON said that a specimen illustrating Dr. W. A. Lamborn's interesting discovery at Oni, near Lagos, was exhibited to the Society in December 1911 (*Proc. Ent. Soc. Lond.*, 1911: xcv), but a description of the method was not at the time available. He had recently written to his friend and had received the following answer :—

" 21 December, 1929, Fort Johnston, Nyasaland.

" You ask as to the cocoon formation of *Norasuma kolga*. The larva spun a loose net with the sham Bracon cocoons on it and then made the denser cocoon underneath, afterwards thickening this with some fluid, I think rectal, though I am not sure."

The effect of the fluid, probably some uric acid derivative, was to give a reddish colour to the cocoon against which the overlying bright yellow cocoon-like objects were very conspicuous. The mimetic resemblance was doubtless a protection against Vertebrate enemies which would be likely to have learned that a parasitised larva or pupa was valueless as food.

DR. W. A. LAMBORN'S DISCOVERY OF THE MUD CYLINDERS IN WHICH THE PUPAE OF *TABANUS BIGUTTATUS*, WIED. (DIPTERA), ARE PRESERVED FROM THE DANGER OF EXPOSURE BY CRACKS DURING THE DRY SEASON.—Prof. POULTON, in the absence of the author, presented a copy of his paper on this subject published in 1930, *Proc. Roy. Soc.*, B, 106: 83, and exhibited specimens of the fly and its puparium from Mzeze, about 32 miles due north of Fort Johnston, Nyasaland, where his observations were made in August 1929; also his sketch of the cracks traversing the mud but never invading the cylinders. Photographs of natural size, showing three aspects of a cylinder were also shown. The method by which the larva carves out the cylinder from the surrounding mud was briefly described :—the line of weakness produced by a close spiral tunnel—the rapid ascent towards the surface cutting across the ridges between the turns of the descending spiral—the opening below the summit, sealed after the entrance of the larva, and the formation of a central tube in which the pupa can descend to escape the heat—finally the boring

through of the thin clay cover by the spinous anterior end of the pupa, and the emergence of the imago.

[Since the meeting I have received the following appreciation from my friend Prof. James Mark Baldwin, the distinguished American Psychologist—"7 February, 1930.—As to the discovery of Lamborn, it seems *complete*—one of those rare cases of a single experience being sufficient to establish both a fact and a reason for the fact! It is beautiful."—E.B.P., 10 February, 1930.]

VARIATION IN PHASMIDAE FROM VITI LEVU, FIJI.—Prof. POULTON exhibited three leaf-like female PHASMIDAE of the genus *Chitoniscus* collected on Guava (*Psidium*) by Dr. R. C. L. Perkins, F.R.S., near Suva, in January, 1905. The tegmina of one specimen, rather larger than the others, were bright green and the margin of the abdominal segments smooth; of the others the tegmina of one were pale green and the other faintly greenish, mottled with a very pale orange, while the abdominal margin of both was strongly lobed. These last two specimens were named *Chitoniscus lobiventris*, Blanch., in the British Museum collection, and the first *C. feedjeanus*, Westwood. Mr. Uvarov, who had kindly determined the specimens, had also observed differences in the anterior legs and was inclined to believe that they were distinct.

[Dr. Perkins had written 10 February, 1930 :—"So far as I remember I had originally about six females of the *Chitoniscus* from Fiji and one or two males. Only two of the females were practically alike in the edge of the body, and I perfectly remember there were differences in the legs of some of them. But as all were taken on guavas in one locality it seems unlikely that there was more than one species, for Fiji does not seem to run to a multiplication of closely allied forms—really adapted no doubt to certain slightly different conditions of life—as Hawaii does. The males so far as I remember are very small creatures and probably would not show differences like the females—whether varieties or species. The males are, I believe, considered great rarities: at least I know Koebele, who collected in Fiji on several occasions and for considerable periods, thought that they were very scarce as compared with the females. Their small size and inconspicuous appearance alone would lead to their less frequent capture, for they would easily be passed over among the fallen leaves when one happened to beat them."]

On the hypothesis that only one species was present the variation was probably of the same kind as that of such butterflies as *Kallima* in which several of the different but familiar appearances of dead leaves were resembled. In the *Chitoniscus*, however, the differences were even more striking, as they went far beyond colour and pattern, and affected the contour of the body.

THE PROTRUSION OF ANAL SCENT-BRUSHES DURING FLIGHT BY THE MALE *EUPLOEA CORE*, L., OBSERVED BY H. G. CHAMPION, AT DEHRA DUN.—Prof. POULTON said that he had received the following record of an observation made by his friend Mr. H. G. Champion, M.A. :—

"1 December, 1929, Forest Research Inst., Dehra Dun, U.P., India.

"I have read with interest the correspondence in recent numbers of *Nature* in which you and Prof. MacBride have taken the chief part. One point in it caught my attention and surprised me—the mention of the number of observations in

which the Danaine male brushes have been seen in play. [*Nature*, cxxiv, 12 Oct., 1929, pp. 577, 578.] I was under the evidently mistaken impression that, since their meaning had been explained, there had been plenty of observations in confirmation. My wife and I one day watched a male *Euploea core* flying in the garden here, protruding the very conspicuous brushes every now and then. I told her what he was about as we watched, and I hoped a female would turn up to complete the tale, but the male took alarm at something and flew away over the top of the bushes: I was unable actually to discern a scent left behind. This species breeds in the garden on Oleander, and I hoped to rear a few and get further data, but the pupae met with an accident. We will try again next season.

"I always look out for bird attacks on butterflies, but have not seen anything worth record for one reason or another. I will let you know if I have anything noted in that line."

Prof. Poulton said that the late Col. J. W. Yerbury had told him of a similar experience with the same or a closely allied *Euploea* in Ceylon. He had quite formed the opinion that the performance was epigamic and spoke of the butterfly as scenting the air as it flew. It was by no means certain that the scent from the brushes of *Euploea core* could be perceived by man, although that of the male *Amauris niavius*, L., had been found by Dr. Lamborn to resemble an aromatic snuff (*Proc. Ent. Soc. Lond.*, 1918: clxxii). The stimulation of females by a generally distributed epigamic scent was not improbable, but further observations were required.

THE POLLINATION OF A SECOND AUSTRALIAN ORCHID BY THE ICHNEUMON *Lisso-Pimpla semipunctata*, Kirby (HYMENOPTERA PARASITICA) OBSERVED BY MRS. EDITH COLEMAN.—Prof. POULTON said that Mrs. Coleman had kindly sent him a copy of her recent paper (1929, *Victorian Naturalist*, 46: 62) for the Society's library. Fellows would be interested to read in it an account of the pollination of the "Large Tongue-orchid," *Cryptostylis subulata*, Reichb., by the male of the same ichneumon which fertilises *C. leptochila*, F.v.M., as described and figured in our *Transactions* (1928, 76: 533). In the more recent discovery the behaviour of the insect was found to be somewhat different and even more remarkable.

Papers.

The following papers were read:—

1. "New African Lymantriidae," by Mr. C. L. COLLENETTE.
 2. "Thoracic and elytral abnormalities in Coleoptera," by Dr. E. A. COCKAYNE.
 3. "Carabidae of the Third Mt. Everest Expedition, 1924," by Mr. H. E. ANDREWES.
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Wednesday, March 5th, 1930.

Dr. K. JORDAN, President, in the Chair.

Notice of a Special General Meeting.

The PRESIDENT announced that a Special General Meeting of the Society would be held on 18th June, 1930, during the session of the 3rd Imperial Entomological Conference in London.

Election of Fellow.

The following was elected a Fellow of the Society :—Rev. EDWIN GEORGE BUCKNILL, M.A., The Bluff, Yokohama, Japan.

Exhibits.

THE TRUE *NONAGRIA NEURICA*.—Mr. H. J. TURNER exhibited, on behalf of Mr. Wightman, a series of the true *Nonagria neurica*, Hb., with the species *N. dissoluta*, Tr., so long confused with it in British collections. The series of *N. neurica* consisted of typical forms (Hübner's fig. 381), the reddish form ab. *rufescens*, Edlstn., and the blackish-brown form ab. *fusca*, Edlstn. The series of *N. dissoluta*, Tr., comprised the typical forms (Hübner's fig. 659–61), the dark form from Yorkshire, the usual British form subsp. *arundineta*, Schmidt, the light form from various localities and including ab. *rosea*, Tutt, and a yellow-tinged form. The former species was extremely local, being practically confined to one portion of Sussex, while the latter was spread over many districts of Britain as the form *arundineta*. The white crest of *N. neurica* is absolutely distinctive, that of *N. dissoluta* being self-coloured. The latter has a dark lunule on the underside of the hind-wings which the former does not have. According to Mr. Wightman, the larva of *N. neurica* is dull white, lined and suffused with greyish-brown, that of *N. dissoluta* and of its form *arundineta* is greenish-white with pinkish dorsal area. The genitalia fully confirm the distinction.

PARASEME AND PARASEMATIC AS CONVENIENT WORDS TO DESCRIBE APPEARANCE AND BEHAVIOUR ADAPTED TO DEFLECT OR MISLEAD AN ENEMY'S ATTACK.—Prof. POULTON said that he had for many years sought for a word which would describe the appearances, movements and instincts which deflect the attack of an enemy by diverting its attention towards some non-vital part or leading it to a futile pursuit in place of an easy capture.

Abundant instances of this method of protection are found in many groups of animals—the long bushy tails of mammals; the pretended lameness of birds leading a pursuer away from the nest; the easily broken-off tails of lizards and claws of crabs, especially effective when the active movements of the discarded part render it for the moment a more interesting object than the quietly escaping owner; the eye-like marks near the tails of fishes combined with the obliterating effect of pattern upon the true eye and with modified movements. But it is among insects

THE ENTOMOLOGICAL SOCIETY OF LONDON

THE FELLOWSHIP AND FEES.

Fellows pay an Admission Fee of £3 3s. The Annual Contribution of £2 2s. is due on the first day of January in each year, and is payable in advance.

Fees should be paid to the Treasurer, at 41, Queen's Gate, S.W. 7, and *not to the Secretary.*

Fellows desiring to pay their Annual Contribution through their bankers can obtain an official form of banker's order by applying to the Treasurer.

Fellows whose Contributions for the current year have been paid are entitled to receive the publications of the Society free of charge. Further copies may be purchased at reduced prices by applying to the Secretary.

Forms of application for Fellowship, copies of the Bye-laws and the List of Fellows may be obtained from the Secretary.

MEETINGS AND EXHIBITIONS.

Intending exhibitors are required to send in their names and the nature of their exhibits to the Secretary *before noon* on the day of the meeting, in order that they may be called upon from the chair. Descriptive notes of all exhibits should be handed to the Secretary *at the same meeting* for printing in the Proceedings. If the epidiascope is required, 24 hours' notice must be given.

Fellows resident abroad, or who are otherwise unable to attend, are reminded that any specimens, notes, or observations they may send to the Secretary will be considered by the Council, with a view to exhibition or reading at the meetings of the Society.

PAPERS AND ILLUSTRATIONS.

Fellows desiring to communicate papers to the Society must send the manuscript of such papers to the Secretary, 41, Queen's Gate, London, S.W. 7, at least fourteen days prior to the date of the meeting at which it is proposed that such papers shall be read. Authors desiring their papers to be published in the Transactions must submit the manuscript, and proposals for illustrations, if any, to the Secretary at least fourteen days before the meeting of the Publication Committee at which it is desired such papers should be considered.

Authors proposing to illustrate their papers should communicate with the Secretary before the drawings are executed. The size of the finished work on plates should be limited to $7\frac{1}{2}$ ins. by $4\frac{3}{4}$ ins., after allowing for reduction, if any.

Attention is called to the Instructions to Authors issued with Part I of each volume, which may also be obtained at the Office of the Society. Inattention to these regulations may involve an author in considerable expense.

WANTED.

The Society is willing to purchase volumes or parts of the Transactions for the years 1907, 1908, 1910, and 1912.

MEETINGS

TO BE HELD IN THE SOCIETY'S ROOMS

41, QUEEN'S GATE, S.W. 7

1930.

Wednesday, October	1
"	"	15
"	November	5
"	"	19
"	December	3

1931.

"	January (Annual Meeting)	14
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The Chair will be taken at Eight o'clock.

THE LIBRARY

is open to Fellows, and their friends when accompanying them, daily from 10 a.m. to 6 p.m. (Saturdays, 10 a.m. to 1 p.m.). On the nights of meetings it remains open until 10 p.m. The Library is closed during September.

NOTICE

Fellows are informed that they can have their Transactions bound at the following prices by the Society on application to the Secretary.

Cloth : old size, 4s. 3d.; new size, 5s.

Buckram : old size, 4s. 9d.; new size, 5s. 6d.